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ADJUSTMENT IN PUBLIC SECTOR LABOUR MARKETS:
THE CASE OF POLICE SERVICES

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ADJUSTMENT IN PUBLIC SECTOR LABOUR MARKETS
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I. INTRODUCTION

In Australia, police employment is the responsibility of state and territory governments. There is only a small police force related to central government functions in the Australian federation. Total Australian police officers in 1980 were almost 30,000, and there were also some 5000 civilian support staff (See Table 1).

In this chapter we look at major manpower trends in the Australian police forces for the 1960s and 1970s and what these indicate about labour market adjustment in this type of public employment. The chapter looks at the major institutions involved in the police labour market, the labour characteristics of police, trends in police labour requirements and labour availability and adjustment processes in this labour market. General conclusions obtained from this review are then further tested in a statistical analysis and final conclusions about adjustment processes are presented.

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II. INSTITUTIONAL BACKGROUND

The major policing functions in Australia are crime prevention and crime investigation and traffic and accident control. There are also some general governmental functions, especially in country areas, but crime and traffic occupy the greater part of ^{direct} police duties. The forces in Australia are largely organised along traditional British lines, though covering larger geographical areas. Within each state, the basic organisation is through police districts for general policing, along with more specialised functions concentrated in major cities. The forces are led by a Commissioner of Police responsible to the relevant Minister.

As public employees police receive emoluments funded from government budgets. The actual wage levels and conditions of service are determined, however, by public service tribunals, specific police wage boards or State arbitration commissions. This pattern of compulsory arbitration in determination of conditions of police employment is a long-standing feature of Australian police remuneration, and differs from the situation in most overseas countries. In most of the police forces, salaries and conditions for the very highest police officers (Commissioner, Deputy Commissioner and Assistant Commissioner) are determined separately from other police wages, often directly by the government in conjunction with other senior executive government salaries. This study concerns itself only with remuneration and conditions covered by the major tribunals or commissions. In some cases, the tribunal also makes a separate award for commissioned officers.

In the determination of employment conditions, the various tribunals typically operate within an adversary framework. A formal presentation of the employer's

(government) attitude is made and matched by representations from the employee side. The employee role is taken by police associations or by police unions. Some forces have a single employee representative body, whereas other have two: one for commissioned officers and the other representing other ranks. Unlike conventional private sector unions, police associations do not usually have resort to strike options since this is outlawed in relevant state/^{industrial} legislation. The Melbourne police strike of 1923 took place in spite of this prohibition.

Entry into all the police forces is ^{usually} at the lowest rank, after recruit training, which may be preceded by cadet training for some entrants. Physical, educational and character conditions of entry must be satisfied before selection for training. Women have conventionally been excluded from general police work but this has changed somewhat in recent years. Successful completion of training results in appointment as a probationary constable,

whereafter eligibility for promotion is subject to the achievement of length of service requirements and the satisfactory completion of internal exams and other assessments. Actual promotion from those eligible depends also upon vacancies, which is a function of other internal force personnel movement and of finance. There is little or no lateral recruitment into police forces, except for a small number of specialist support positions.

It is apparent from this description of the major institutional features of the police system that this labour market is an unusual 'market'. There are only a limited number of employers, each of which is a monopoly provider of police services within its jurisdiction. Private security companies do provide some close-substitutes for a limited range of police services, but the core of police

largely functions is/restricted to the official police forces. Police employers are public agencies and are in no substantial way obliged to concern themselves with profit maximisation, since no product is sold in the market, and funding is instead provided from consolidated revenue (including some fines and fees partly related to police activities). With base level recruitment and no lateral entry, organisation is hierarchical and bureaucratic. On the demand side, then, this market comprises non-profit monopsonists with significant internal labour markets. // On the supply side, the labour market is typified by substantial job-specific skills acquired through on-the-job training. Entry is relatively unskilled, subject only to general requirements. Police are represented by employee associations which have no legal recourse to the strike weapon. The formal determination of conditions of employment does not take place through either markets or collective bargaining, but ^{mostly} by arbitration (including consent/awards). Unlike arbitration for the private sector in Australia, police tribunals determine minimum and maximum conditions. There is no "over-award" remuneration. // With features such as non-profit motivation, internal labour market structures, absence of strike powers, and the presence of binding arbitration tribunals, the police labour market is at a considerable remove from both the competitive stereo-type and the ^{conventional} collective bargaining model.

The rest of this paper examines the workings and outcomes of this special type of labour market. In doing so primary reliance will be placed on data derived from Australian Bureau of Statistics sources (both the Census and more frequent compilations published in the Australian Year Book, Social Indicators and individual state ABS publication) and, more often for criminal justice statistics, direct from state police department, law department, and police union Annual Reports and unpublished data. Sources will be cited and a full discussion of the adequacies or otherwise of the data available is given in Withers (1981b). In that paper a set

of annual estimates is given for major criminal justice system data for each state and territory 1963-64 to 1975-76. Major series have been updated on the same basis indicated in that paper. Most statistical comparisons will commence in 1964 since this was the first year in which "uniform" crime statistics were collected and published for Australia. Data on a comparable basis cannot be comprehensively compiled other than on an annual basis for all police forces in Australia over time.

However before examining trends evident in the data a brief picture is provided from 1971 and 1976 Census material, summarising the nature of the police labour force.

III. POLICE CHARACTERISTICS

In this section major characteristics of police in Australia are summarised. The data sources are the 1971 and 1976 Censuses of Australia. 1981 Census data are not yet available. Comparison of the census data with police department records as at June in those years indicates a census under-enumeration (4.9%), but this is not expected to affect the general representativeness of tables referring to percentages and proportions. In both censuses there is almost complete (.97) overlap between those reporting police industry and police occupation, so no further distinction is made between industry and occupation here.

Figure 1 shows the number of police per 100,000 population in 1971 and 1976, by state and territory. The most evident feature is the high policing rate in the two Territories, and the Northern Territory's dramatic rate of increase 1971-1976. Sub-state disaggregation shows further that in all cases except Western Australia, policing rates were markedly higher in metropolitan areas.

FIGURE 1: PER CAPITA POLICE PROVISION:
AUSTRALIAN STATES AND TERRITORIES, 1971 & 1976

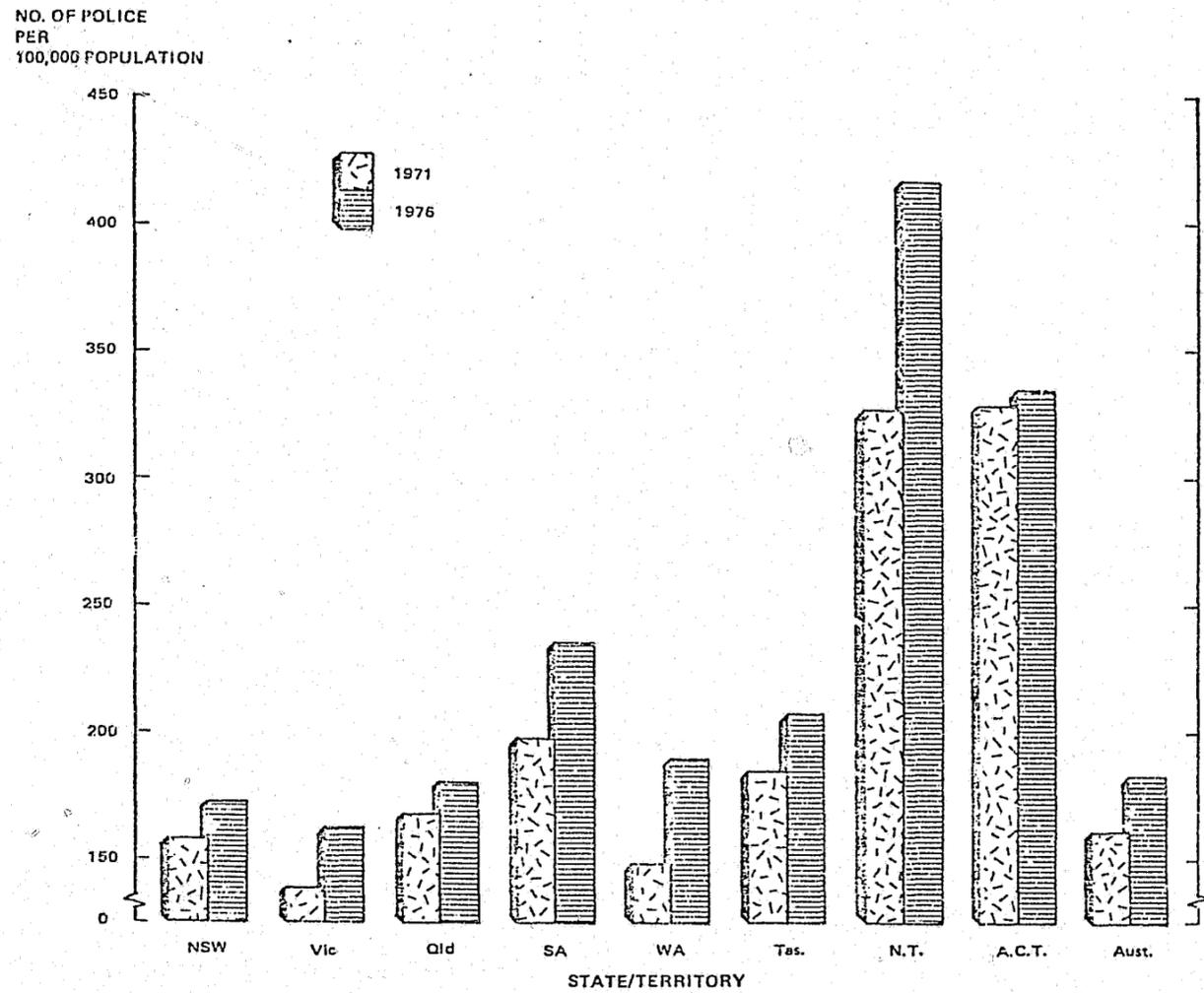


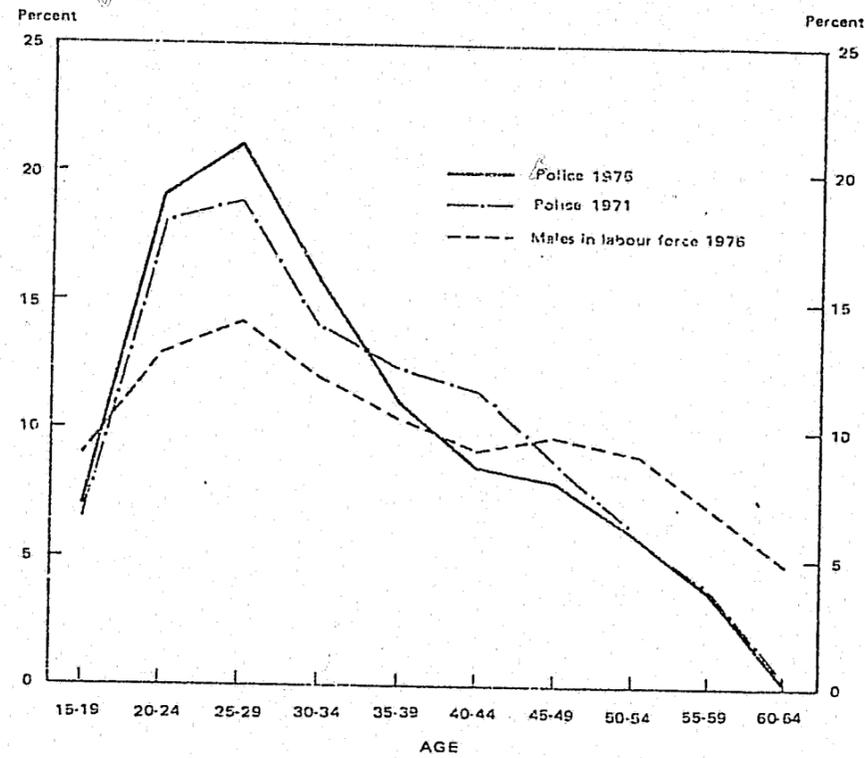
Figure 2 shows the age distribution of police at the two censuses and the 1976 age distribution for males in the labour force. The police distribution is more skewed toward lower age groups, and this tendency increased for police between 1971 and 1976.

Figure 3 provides a comparison of the educational qualifications of police with those of the general male population aged 20-64 in 1976. The proportion of police with no post-school qualifications is more than that for the general male population, and only 1 per cent of police reported tertiary qualifications compared to 7 per cent for the male work force. On the other hand police reported a higher incidence of trade qualifications. This quite significant share of trade qualifications represents a substantial increase on 1971 when only 14 per cent of police reported such qualifications. By 1976 over 6,000 former tradesmen were police officers as opposed to 117 with bachelor or higher degrees.

Figure 4 shows police income compared to all employed males in 1976. There are no 1971 census data for income. In 1976 46 per cent of all police incomes fell in the \$9,001 to \$12,000 range, showing a marked concentration compared to the general labour force position for males. Other employed males experienced a more evenly spread distribution including considerable proportions between \$6,001 and \$9,000.

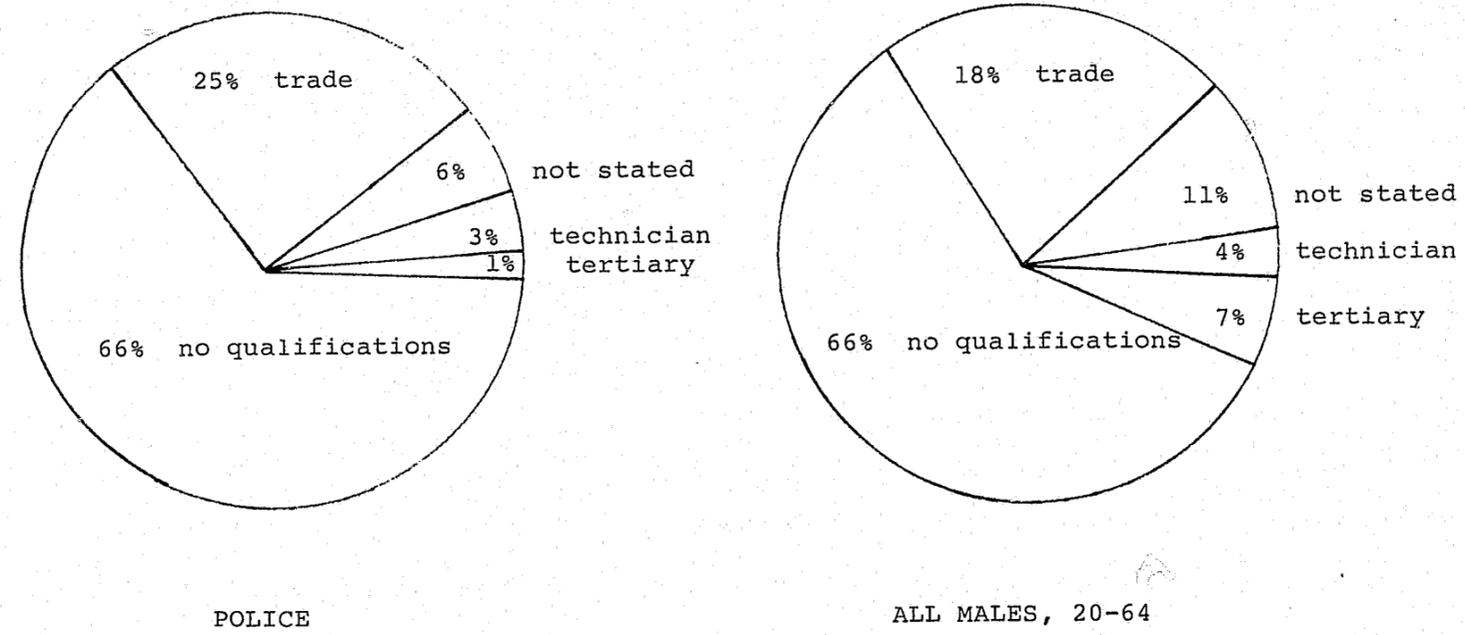
In summary, the police labour market is characterised by a relatively young and less well-educated workforce, disproportionately found in the Territories and also SA and Tasmania. There is also a disproportionate (and increased) trade skills representation, and higher incomes than average. The police forces are overwhelmingly male - 96.3 per cent in 1976.

FIGURE 2: COMPARITIVE AGE DISTRIBUTION OF POLICE AND MALE LABOUR FORCE: AUSTRALIA, 1971, 1976.



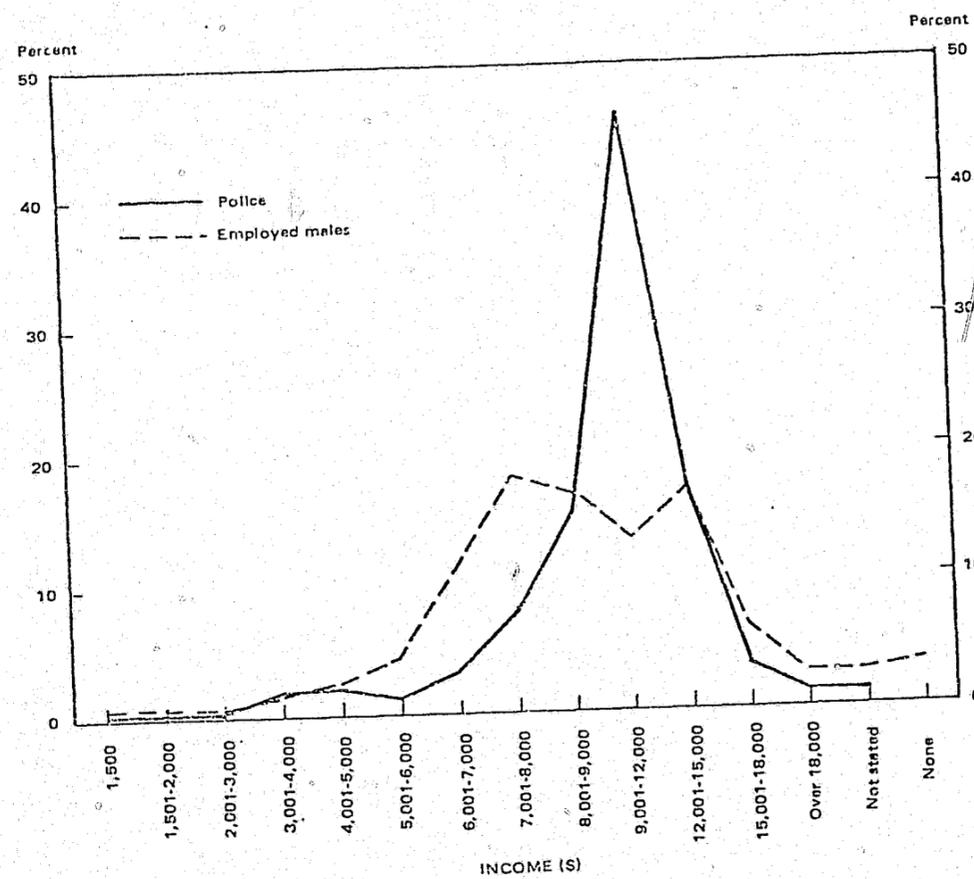
Source: As for Figure 1.

FIGURE 3: EDUCATIONAL QUALIFICATIONS OF POLICE AND ALL MALES, 20-64.
CENSUS, 30 JUNE 1976



Source: ABS, Census of Population and Housing, 1976

FIGURE 4: INCOME OF POLICE AND EMPLOYED MALES, 1976.



Source: As for Figure 1.

IV. POLICE REQUIREMENTS AND AVAILABLE LABOUR

In competitive theory, labour requirements are derived from a cost-minimising input calculation associated with producing the most profitable level and type of output for the firm. For public sector labour however this process of calculation is less evidently applicable. In the case of police, two basic ^{formal} approaches to manpower requirements are common: a needs approach and a population approach. The former seeks to relate policing requirements to police functions and the latter relates policing levels more mechanically to population levels. Internally, Australian police departments' manning requests vary in their use of these approaches and, of course, government attitudes, including financial, can precondition submissions received and can alter the requests approved and implemented.

Since police functions relate basically to crime control and traffic control, indicators of the needs approach to manning can be compiled using crime and traffic measures. This is not necessarily a simple task, since there are statistical and conceptual problems in the measurement of these functions. One approximation is to measure crime as total selected reported crimes, where these are defined uniformly across states. However it could be suggested that treating a homicide as the same as a car theft (*i.e.* each as one crime) is misleading. Accordingly a supplementary measure intended to capture differences in public concern over particular types of crime can be proposed. A measure of this is weighted crimes, where the weights are derived from psychological research into public attitudes to crime. With regard to traffic, one overall indicator of police need is given by motor vehicles registered. But again it could be that public concern is more focussed on road accidents that produce casualties rather than vehicles as such, so that a supplementary traffic series

indicating police need is given by persons killed and injured in motor vehicle accidents.

The population approach, by contrast, simply requires statistics on population totals over time, though the resultant per-capita provision of police targets are often adjusted to reflect differences in geographical concentration e.g. WA vs Victoria. However state and territory areas are constant, so that over time it is change in total population that is relevant in examining changes in police requirements.

[Insert p.8a here]

The range of requirements indicators just discussed are presented for Australia as a whole for the years 1964-1979 in Table 1. For ease of inspection they are all converted to indexes with base 1964 = 100. Actual values can be readily derived by using the base year equivalent given at the foot of the table. If a fixed-coefficient approach to manpower requirements is adopted so that police numbers are related to output indicators in the base year, it is evident here that police requirements have risen most dramatically in relation to motor vehicles and crimes. A more moderate increase in requirements is indicated by accident and population trends.

"Requirements", of course, is not the same as "demand". The latter also takes account of the relative costs of employment of police and of competing demands for provision of other government services. However, for purposes of analysing labour market adjustment, the notion of requirements is most useful. By comparing fixed coefficient requirements indicators with supply, pressures for adjustment can be indicated and failure to match requirements can be seen as one form of adjustment in this type of labour market - along with other adjustments which do seek to meet requirements through wage changes, entry standard changes etc.

The use of violent weighted crime as an indicator is a further refinement which could help control for a possible problem of interdependence between police numbers and recorded crime levels i.e. the more police there are, the more crimes may be reported or discovered. However unrecorded crime is not a major problem with serious violent crimes, as shown by social surveys inquiring whether incidents were reported to police (ABS, General Social Survey - Crime Victims, May 1975, 4105.0). ^{This is untrue for rape, but} Most violent crimes are reported. Also police efforts naturally give priority to detecting and investigating crimes in this area of highest public concern, so that provision of additional police is not likely to lead to significantly higher reporting or detection of ^{serious} crimes of violence, as opposed to minor property and traffic offences.

TABLE 1

POLICE REQUIREMENTS INDICATORS: AUSTRALIA, 1964-1979
(INDICES; 1964 = 100)

Year	Motor Vehicle Accidents	Motor Vehicles Registered	Selected Reported Crimes	Weighted Violent Crime	Total Population
1964	100.0	100.0	100.0	100.0	100.0
1965	104.4	105.1	105.8	101.8	102.0
1966	103.7	111.2	109.1	112.4	103.9
1967	106.9	116.9	109.5	121.2	105.7
1968	109.7	123.3	124.4	128.5	107.5
1969	116.8	131.0	136.6	138.8	109.8
1970	121.7	135.5	160.4	174.4	112.0
1971	121.7	143.8	186.6	209.0	114.2
1972	122.7	146.4	216.2	227.8	116.0
1973	130.9	155.9	203.6	235.2	117.6
1974	125.9	164.1	215.0	251.2	119.5
1975	122.8	173.7	226.9	270.5	120.9
1976	120.0	183.1	243.6	260.7	122.6
1977	126.1	190.7	272.5	281.1	126.0
1978	133.1	198.9	309.5	287.5	127.6
1979	126.5	205.6	340.8	304.0	129.2
Base Value	53,576	3,587,000	40,359	100	11,166,000

Sources:

Accidents as given in ABS, Road Traffic Accidents Involving Casualties, 9402.0 and registrations as given in ABS Motor Vehicle Registrations, 9304.0. Selected reported crimes covers homicides, robbery, rape, motor vehicle theft, fraud, forgery and false pretences as given in ABS Year Book Australia 1301.0 and weighted violent crimes combines the first three categories using weights from Akman and Normandeau (1967).

It might be thought that if there is evidence that applications to join the police force considerably exceed actual enlistments, then police force strength will directly represent effective demand, even if not requirements. The logic is that if applicants are being turned away, then realised manning must reflect ^{employer} demand rather than supply since it is the former which determines the market outcome. There is some evidence of excess applicants for Australian police forces, however the logic outlined need not apply when it is acknowledged that all labour is not the same. If a significant proportion of applicants do not meet quality requirements, supply might not be in excess.

The broad base for supply for an occupation not requiring formal job-related training prior to entry, is the whole labour force. However conventional police department policies regarding no lateral recruitment, reliance mainly upon males, and limited return to further formal education quickly narrow the effective eligible recruit pool, as do minimum requirements imposed for physical, mental and character standards. Within such requirements eligible persons choose between police and non-police jobs on the basis of the relative pecuniary and non-pecuniary net benefits of police work compared to their best available civilian alternatives.

The constraints imposed upon police force entry indicate how much official policy narrows the available recruit population. In principle population change and these given constraints could be modelled in a manner akin to the "fixed coefficient" approach to demand analysis. Supply constraints in the base period regarding age, sex, education etc could be taken as given, and calculations made of persons meeting those constraints in subsequent periods. Shortages or surpluses identified by comparing fixed coefficient supply with fixed coefficient requirements could

then be examined to see if they lead to adjustments in the labour market. A detailed application of this approach here is limited by lack of full information on population attributes as regards meeting physical, education and character requirements for police entry, and by the fact that the eligible pool is still likely to significantly exceed police requirements, with occupational choice (including tastes and alternative employments) remaining a major undefined supply consideration in a way that is different from occupations more closely constrained by occupational training or qualifications.

[Insert p.10a here]

The broad supply parameters within which any police manpower policy must operate are indicated in Table 2. The first comparison there is of the total labour force and the labour force for 16-24 year old males. The difference between the two series indicates how sex and age rapidly narrow the supply pool under ^{police recruiting} current practices. The movement in the young male series over time indicates that the potential recruit pool has grown by less than total population, and hence is considerably below manpower requirements growth rates either on a population basis or, and much more so, on a needs basis related to alternative measures of crime and traffic accidents. This picture is further affirmed and accentuated if the very limited involvement of tertiary graduates in police work is allowed for. An index given for available male labour force 15-24 has further deducted male tertiary graduates in that age group and shows that the eligible pool has remained below 1964 levels in all years to 1979.

[Insert p.10b here]

Of course the necessity to recruit to meet required manning levels depends upon losses from the existing stock as well as any desired changes in that stock of police. The losses from Australian police forces over the period 1964-1979 are also indicated in Table 2. It is observed that

Nevertheless the nature of alternative employment options will be defined below in examining wage adjustments, where wages in the military and skilled trades as well as average earnings will be considered. Thus, providing there is no change over time in attitudes ("tastes") toward police careers, a broad comparison can be made between an available labour pool (constrained by age, sex and education) and fixed coefficient police requirements. Over time this comparison can be interpreted as an indicator of movements in relative shortages or surpluses as compared to the base year - even though it cannot be used as an absolute measure of the extent of shortage.

A proviso is the absence of changes in underlying career preferences, for which there is little information. By contrast, military authorities regularly survey young men's attitudes toward military careers as a basis for military recruiting policy. A general finding there is that preferences were largely stable over the post-war period except for the period of involvement in actual conflict e.g. Korea, Borneo, Vietnam, or for times of major military disaster in peacetime e.g. the loss of HMAS Voyager. Since police do not experience such involvements or disasters, it might not be too misleading to accept the hypothesis of no trend change in tastes. An alternative hypothesis of modern society producing a more cynical attitude to the role and nature of police could be proposed. If this is true the relative shortages or surpluses trend measure discussed may understate shortages or overstate surpluses. However given the qualitative trend nature of the indicator proposed, this is not likely to be a problem if that trend is clear. Accordingly it is still useful to compare fixed coefficient requirements with the available labour pool.

An increased share of unemployment in that pool (eg since 1974) might imply a greater availability of recruits. But studies in the related area of military recruitment find no relation between unemployment and recruitment - largely because unemployment itself is considered by the Forces as an indicator of unacceptable quality in applicants (Withers, 1979). There is casual evidence that the same applies for police forces. The result is that it seems true that police recruitment has been basically operating in a no-growth market for 15 years.

TABLE 2

LABOUR SUPPLY TRENDS
AUSTRALIA 1964-1979

Year	Police Force Losses	Labour Force	Male Labour Force, 15-24	Available Male Labour Force, 15-24
1964	100.0	100.0	100.0	100.0
1965	114.2	103.1	103.2	97.1
1966	122.3	108.0	95.9	92.5
1967	114.0	110.5	93.1	89.5
1968	128.1	113.1	91.1	87.1
1969	144.7	115.9	89.6	85.6
1970	154.8	120.5	91.8	86.5
1971	133.5	123.5	91.2	85.2
1972	133.9	126.7	92.7	86.2
1973	140.5	129.7	95.3	88.1
1974	163.0	132.0	94.7	86.2
1975	142.1	134.8	100.7	90.9
1976	155.3	136.3	100.8	89.7
1977	144.6	139.9	107.4	95.7
1978	162.3	140.2	108.0	95.5
1979	147.3	141.3	106.5	93.4
Base Year Absolute Value	770	4,541,000	701,900	688,000

Sources:

Police force losses are from Police Department Annual Reports or unpublished departmental data as outlined in Withers (1981b). Labour Force statistics are direct from ABS, The Labour Force, 6204.0 except for 'Available Male Labour Force, 15-24' which deducts male graduates aged 15-24 from the Male Labour Force, 15-24. Male graduates aged 15-24 of universities and colleges were taken from ABS, University Statistics Part I - students 4208.0 and Colleges of Advanced Education Part I - students, 4206.0, and unpublished data provided by ABS.

while wastage levels fluctuate from year to year there has been a notable trend increase over the period, implying an increase in replacement requirements necessary to maintain force levels. Yet this has taken place at a time when the available recruit pool has contracted and when fixed coefficient requirements would indicate a need to expand police strength.

Overall the impression given by the indicators surveyed is of increasing relative pressure on the police labour market compared to the situation of the mid 1960's. Figure 5 illustrates the increasing divergence between requirements and available labour over the period. The next section examines the adjustment processes in this labour market that might be associated with this changing situation.

V. ADJUSTMENT PROCESSES

Given the background of requirements trends and supply forces outlined in the previous section, the actual level and composition of police forces achieved reflects accommodation or adjustment to those trends and influences. In making such an adjustment governments and police authorities have a wide range of adjustment options to consider.

The basic structure of labour adjustment adopted here is to say that it can operate through price, quantity, quality, information and training, labour - labour and capital - labour substitution. Each of these mechanisms is reviewed in turn to examine the extent to which it is an option in the police context and to examine what evidence there is on its operation in Australia since the early 1960's. Only total Australia data are considered in this section, but

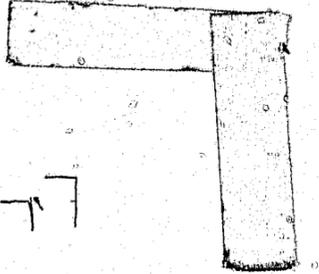
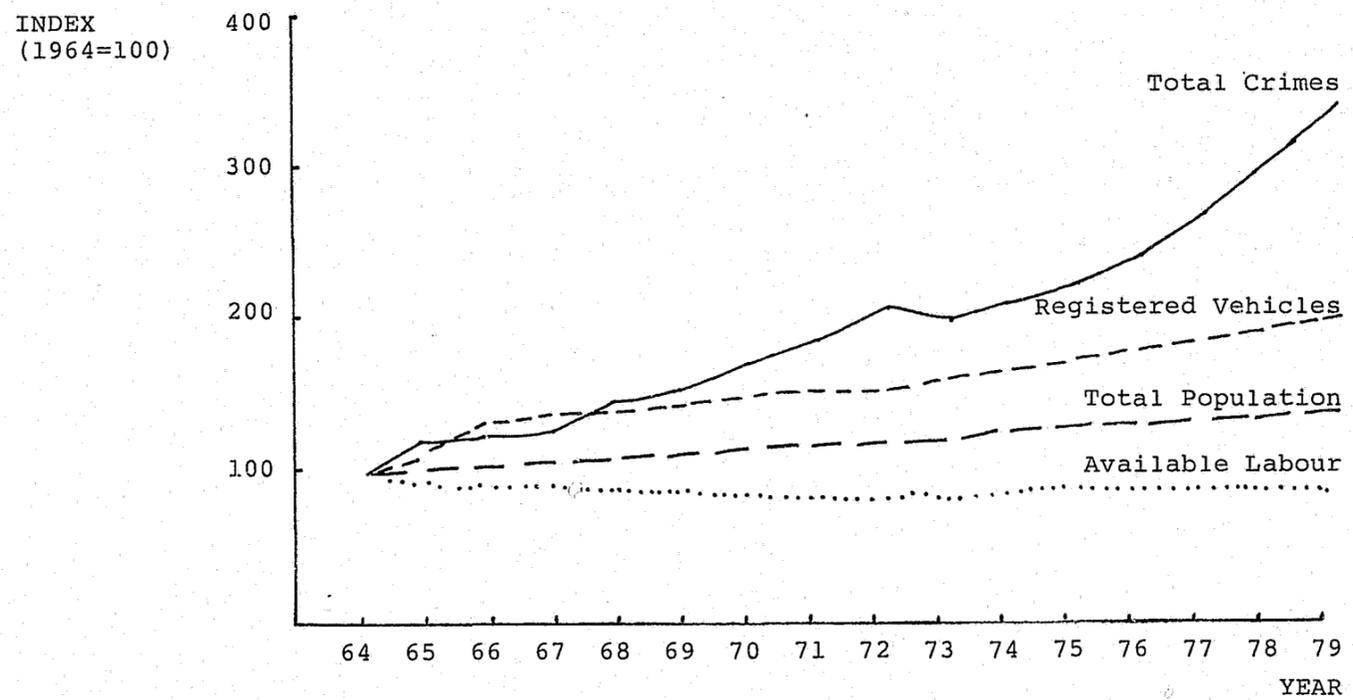


FIGURE 5: RELATIVE REQUIREMENTS AND LABOUR AVAILABILITY: AUSTRALIAN POLICE FORCES, 1964-1979.



Sources: Tables 1,2.

the issue of whether disaggregation to state and territory level assists explanation is considered using more formal statistical methods in the next part of the paper. Thus this section proceeds with an institutional approach and then conclusions are checked with more formal statistical analysis in the next section. Accordingly the present focus is on general trends and directions of adjustment rather than precise year by year correlations.

(a) Wages

The conventional focus of economic discussion of labour markets is upon wages as the adjustment mechanism. In the case of Australian police, wages are arbitrated and no over-award wages are paid. The question thus becomes that of the extent to which the arbitration tribunals operate to clear the market in response to the evidence and claims before them. Table 3 presents data on the level of police recruit wages and experienced police wages, and it provides by way of comparison the alternative wages of military recruits, male average weekly earnings and various skilled trade wage indicators. The latter are included because of the finding in section III above that police forces have a relatively high and rising proportion of persons with trade qualifications.

It is evident from Table 3 that ^{movements in} police wage relativities do correspond somewhat to the trend divergence in requirements from the available recruit pool. By the end of the period police wages had increased more than the comparative wages. However this improved relativity was only really evident in the latter 1970's, so that for well over a decade there was little overall improvement in police wage relativities, though experienced police did move ahead of the military recruit and fitter in the early 1970's. This slightly divergent position for experienced police compared to police recruits is consistent with concern over

TABLE 3

WAGE RELATIVITIES INDICES, 1964-1979

Year	Police Recruit	Experienced First Constable	Private Security Award	Military Recruit	Fitter Award	Carpenter Joiner Award	Builder Labourer Award	Male Average Weekly Earnings
1964	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1965	102.9	105.1	105.2	125.1	101.4	101.3	103.6	107.6
1966	105.6	110.1	111.2	127.4	106.2	105.5	108.9	112.4
1967	110.7	116.6	115.4	134.6	111.2	109.9	112.6	119.9
1968	116.7	125.5	126.1	136.9	131.9	128.1	119.7	126.9
1969	122.3	131.7	129.8	139.8	135.9	141.3	122.9	136.4
1970	132.0	141.4	146.9	146.6	135.9	150.6	142.0	147.9
1971	137.7	149.7	155.6	161.8	158.2	164.5	160.9	164.3
1972	164.2	181.8	179.3	179.6	170.1	187.7	180.1	181.0
1973	181.5	192.8	211.7	185.3	186.5	201.7	204.7	197.3
1974	205.6	220.7	283.4	213.2	253.9	286.0	285.4	229.3
1975	259.3	275.4	293.6	281.3	272.2	327.5	358.8	287.4
1976	319.1	337.5	346.9	311.6	310.9	371.2	405.2	328.7
1977	368.6	378.5	367.2	345.6	342.3	401.5	441.9	369.6
1978	405.2	416.6	411.7	375.8	352.0	418.1	462.6	406.0
1979	463.0	479.6	450.5	388.3	452.4	429.6	482.6	437.4
Base Value	\$2368	\$2900	\$1734	\$2205	\$2189	\$2689	\$2125	\$2683

Sources:

Police data sources are specified in Withers (1981b). Average Weekly Earnings source is ABS 6302.0. All remaining series are from ABS Award Rates of Pay and Prescribed Hours of Work, 6316.0, and represent the Sydney award. These latter series were discontinued in June 1978 but available updates for 1979 were provided by ABS from unpublished data. The private security award is for watchmen, but this correlates closely with data for all other protective services available after 1975 (see Table 5).

the high "wastage" levels identified in Table 2. Wastage rose dramatically in the late 1960's and, consistent with the internal wage relativity change mentioned, declined in the early 1970's before rising again. On the other hand, the increased trades qualifications evident in police forces from comparing the 1971 and 1976 census data does not seem explainable by police/trades wage relativity movements over that period.

(b) Promotion Rates

The police wage figures indicated in the table are for a given position and do not reflect the possibility of more rapid promotion rates as an adjustment mechanism. This is a feasible adjustment mechanism for the police because, while promotion between ranks is usually dependent upon passing examinations, there are large numbers of eligible officers who have met this requirement and are merely awaiting vacancies. Increased wastage creates such vacancies and thus is likely to produce some automatic offsets to future wastage by permitting other officers to be promoted. Within the eligible pool promotion is largely by seniority, so prospects for promotion are well-known.

There is clear evidence that seniority, not merit, is the prime determinant of police promotion. A simple analysis readily demonstrates this. The Report of the 1981 Commission to Inquire into NSW Police Administration (Lusher Commission) included a complete listing of NSW police sergeants (first-class) by seniority, merit rating and official promotion priority (n=111). The merit rating was based on police record, exam points and interview assessments. The Kendall rank correlation coefficients between merit, seniority and official priority are as follows (significance level in brackets):

merit/seniority	.12	(.028)
merit/priority	-.31	(.001)
seniority/priority	.54	(.001)

There is a large and strong rank correlation between seniority and official priority and an inverse correlation with merit. The promotion adjustment mechanism used in the police can clearly have serious efficiency consequences.

Having said this, direct evidence on promotion rates could not be obtained. It would be valuable to obtain wage by age figures but these could not be provided except for the 1976 Census. But this latter gives no basis for comparison over time until 1981 Census data are published. One surrogate measure is given in Table 4 which is the proportion of senior to junior police. There could be "rank inflation" as well as more rapid promotion within ranks as a means of providing higher incomes. The indicator used is the ratio of sergeants, inspectors and executive officers to total force strength and figures could be compiled for 1967 to 1979 (excluding 1975). These data show a basic stability until the latter 1970's. Such changes are difficult to fine-tune to manning requirements but could partly reflect response to continuing high wastage levels in mid 1970's. But this is very speculative and police rank structure should probably not be viewed as a major adjustment vehicle.

(c) Other Conditions of Service

One other aspect of wage adjustment is the fact that wage figures do not fully reflect pecuniary benefits from police employment. There is no over-award pay but there is a range of other allowances and benefits which could have altered. These include lodging allowance, overtime rate, weekend and shift-work allowance, uniform and clothing allowance, night work and public holiday rates, leave provisions, retiring age, pensions, sick pay, and standard working hours. To collate and compare such conditions of employment for 8 police forces since 1964 is a task beyond this present study. Using unpublished Police Federation

TABLE 4

POLICE LABOUR MARKET ADJUSTMENT INDICATORS: AUSTRALIA 1964-1979
(percentages except for indexes)

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Senior Police/ Police Strength	n.a.	n.a.	n.a.	19.53	20.53	20.51	20.78	20.63	20.47	20.67	21.63	n.a.	20.90	20.07	24.73	26.01
Wages and Allowances Index	100	105.8	106.1	113.7	122.5	125.1	137.8	150.7	176.3	194.8	230.0	n.a.	n.a.	n.a.	n.a.	n.a.
Enlistment/ Applications	26.23	24.62	27.17	26.26	25.44	24.58	25.60	24.20	23.45	26.16	24.16	28.26	22.11	25.50	28.95	22.40
Cadets/ Police Strength	2.01	2.52	3.14	2.94	2.70	2.46	2.44	2.67	2.51	2.27	2.31	2.43	2.13	3.27	2.65	n.a.
Female Police/ Police Strength	1.20	1.17	1.28	1.24	1.13	1.30	1.34	1.61	1.92	2.12	2.88	3.29	3.70	4.29	4.99	5.85
Department Civilians/ Police Strength	10.07	10.80	11.42	12.19	12.80	13.82	15.06	16.32	17.02	18.11	18.11	17.03	17.02	n.a.	n.a.	n.a.
Police Expenditure/Total Law, Order & Public Safety Expenditure	56.74	57.17	54.45	55.49	54.19	51.06	51.72	52.47	51.83	53.52	53.29	49.73	52.13	49.38	48.88	48.49
Traffic Police/ Police Strength	n.a.	n.a.	n.a.	11.05	11.16	11.56	12.10	11.74	11.35	10.72	10.09	n.a.	n.a.	n.a.	n.a.	n.a.
Capital Expenditure/ Current Expenditure	7.50	7.60	5.06	3.89	3.68	4.77	4.64	5.36	5.46	5.79	5.86	4.99	6.05	5.73	5.99	5.02
Police Unemployment/ Police Vacancies	.033	.032	.032	.059	.103	.066	.055	.043	.031	.041	.037	.089	.289	.875	1.613	8.333
Committals/ Selected Crimes	42.4	40.04	39.2	39.6	38.4	36.9	34.5	32.4	27.7	28.8	25.5	22.4	18.3	17.2	16.9	n.a.
Convictions/ Selected Crimes	16.8	17.0	17.0	17.0	16.7	15.9	14.7	13.8	11.6	12.1	10.6	9.4	8.3	n.a.	n.a.	n.a.
Police Strength Index	100	102.6	107.1	110.4	114.5	116.8	118.2	122.0	129.2	134.1	141.4	149.6	155.5	168.3	176.4	180.2

Sources:

Senior Police and Traffic Police figures are from ABS, Year Book Australia, 1901.0 until 1974. The Senior Police figures 1976-1979 are ABS unpublished figures. The Police Registered Unemployment and Registered Vacancy figures are unpublished CES data from the Commonwealth Department of Employment and Youth Affairs. Sources for the remaining statistics are outlined in Withers (1981b) except for Police Salary and Allowances which are obtained from federal and state government Treasurers' Statement or Estimates of Revenue and Expenditure. Base year figures for indexes are 17,194 for Police Strength and \$2,937 for Wages and Allowances.

records it was possible to compare conditions across the forces for 1976, and substantial variation in provision was observed. But to allow thoroughly for changes over time was not possible from available Federation records. This is an important omission because the Commission to Inquire into NSW Police Administration (1981), referring to shift penalties and overtime alone, indicated in its Report that, for NSW, "police on general duties, traffic and detective work rely on some \$1,500 to \$2,000 per year in payments for these allowances" (p 207).

An aggregative test of divergence in movement between wages and allowances can be obtained by comparing government budget figures for wages, salaries and allowances with the police wage figures derived from salary tables and included in Table 3. Using Treasurers' Statements or Estimates of Revenue and Expenditure for each state, average police salary including allowances was calculated for the decade 1964-1974. The resultant series is shown in Table 4. This does not permit analysis of the composition of the change nor of changes in conditions which are not reflected in current outlays. It is ^{seen} from the series obtained that the movement in the wage and allowances index is a little above the series for experienced police constables in Table 3 and therefore also above the series for police recruits. There is therefore some slight evidence of increased provision of allowances at a faster rate than wage increases, but the divergence is not major, and so would require unrealistic supply responses for it to be a major adjustment influence.

(d) Work Hours

A very partial indicator of trends in ^{conditions of service} this area is movement in hours worked (and hence also overtime paid). Table 5 gives the limited available data on this. This

TABLE 5

PROTECTIVE SERVICES: EARNINGS AND HOURS, 1976-1980
(Weekly earnings, May)

	Fire Prevention	Police Services	Other Protective Service	All Protective Services
1976				
Ordinary Time Earnings	n.a.	217.5	212.0	201.6
Ordinary Time Hours	n.a.	40.0	39.7	39.9
Total Earnings	n.a.	233.0	186.9	217.6
Total Hours	n.a.	42.6	42.6	42.5
1977				
Ordinary Time Earnings	n.a.	244.2	170.0	223.1
Ordinary Time Hours	n.a.	40.0	39.4	39.8
Total Earnings	n.a.	265.8	234.0	246.0
Total Hours	n.a.	42.5	43.3	42.7
1978				
Ordinary Time Earnings	n.a.	262.3	206.9	240.2
Ordinary Time Hours	n.a.	40.0	38.9	39.7
Total Earnings	n.a.	281.3	183.5	260.8
Total Hours	n.a.	42.0	42.7	42.1
1979				
Ordinary Time Earnings	269.5	280.7	226.0	262.9
Ordinary Time Hours	40.2	40.0	39.6	39.9
Total Earnings	291.5	297.7	262.0	286.3
Total Hours	42.3	41.7	43.8	42.4
1980				
Ordinary Time Earnings	291.0	311.3	261.4	294.2
Ordinary Time Hours	40.7	40.0	39.3	39.9
Total Earnings	314.8	327.6	309.0	320.3
Total Hours	42.8	41.5	44.0	42.4

Source:

ABS, Earnings and Hours of Employees, Distribution and Composition,
(6306.0).

covers the period since 1975 for fire services, police services and other protective workers. It is noted that police are well paid within this group, which also includes attendants, escorts, warders, watchmen, patrolmen, private detectives, security officers etc. Within the group, standard hours have not changed over the period, but it is evident that police overtime has fallen a little while that of firemen and other protective service workers has risen. Accordingly in the latter 1970's work hours was not used as an adjustment mechanism for matching divergent police requirements and available labour supply.

(e) Recruit Quality Levels

Promotion rates can be regarded not only as a wage adjustment, but also as a quality adjustment - the former reflecting a supply side perspective and the latter a demand side view. The demand point is that altered worker characteristics are associated with promotion e.g. officers with fewer years of service may now be accepted. A further quality adjustment could also take place at the recruit level.

In fact formal minimum entry requirements have varied little in Australian police forces in many years. There have been occasional height reductions, the major one being a 2" drop for Victoria Police entry in 1923 following the police strike, and a more recent drop there of ½". Other states have retained a 5'9" minimum height requirement since the early 1960's and minimum education standards (4th year secondary school) have not altered. In 1946 NSW reduced the minimum age requirement from 21 to 19. Several states have actually supplemented existing requirements by general psychological and vocational testing. So minimum standards of entry have not been an important adjustment mechanism, despite the non-growth in the available labour supply situation.

Nevertheless the minimum standards adopted have long provided more applicants to the ^{police} Forces than have been accepted. Accordingly one quality adjustment still possible is to be more or less selective amongst applicants. A growing relative shortage over time would impose pressure to reduce standards and so increase the proportion of applicants accepted. In fact Table 4 shows that the ratio of enlistments to applicants has not been used in this way. No clear trend at all is evident in this indicator. Actual direct measurement of, say, recruit test results or education levels completed would be a better test. But this data is simply not available, so that it must be tentatively concluded that recruit quality variation has not been an important adjustment instrument.

(f) Information and Training

Where relative labour shortages become evident, one possible mechanism that can be used is to offer increased access to preparatory training and to try to improve knowledge of recruitment opportunities amongst the available eligible population. It was not possible to gain meaningful data on recruit advertising and police public relations outlays, but the general impression is that relatively little resources or attention are devoted to this (by contrast with, say, the military).

There are statistics on pre-service training, which in the case of police means the cadet training offered in each state though not in the territory forces. Cadets who complete training satisfactorily gain guaranteed access to police entry, though they must still complete adult training with direct entry adult recruits. The ratio of cadet strength to police strength 1964-1978 is shown in Table 4, but indicates no clear trend. Hence there is no real indication of reliance upon expanded cadet training intakes

being used to try and increase informed available recruit supply.

(g) Labour - Labour Substitution

A number of avenues exist for labour - labour substitution for provision of police services. One is to make greater use of women police in some or most police functions, another is to release police from duties that can be adequately performed by civilians, a third is to substitute reliance upon other law and order employees and processes for police (e.g. reduce court backlogs to deter criminals by speedy punishment), and a fourth would be to increase private purchase of security services. Unfortunately there is little data available on the latter, though it is seen in Table 3 that until the late 1970's the wage incentive favoured reliance upon police.

In each of the other areas indicated however, there is evidence that significant labour - labour substitution is taking place and in the direction implied by growing relative shortages. The ratio of police-women has increased steadily over time and may even be understated here since no figures were obtainable for Queensland from 1977 and so the 1977 level was used and held constant in calculating the ratio given. This non-revelation of gender is said ^{officially} to be part of non-discrimination against women in the Queensland police force, and it is certainly true that Queensland had made the most progress in equal opportunities by 1977. (Unpublished figures for Queensland made available since the calculations were completed, indicate a steadying in 1978 at 8.0% and a slight fall to 7.3% of force strength in 1979.)

Similarly figures available for civilian departmental strength to 1976 show a steady increase in the relative use of civilians. At the same time there is a steady trend evident in increased reliance upon other elements of the criminal justice system other than police. Employee numbers

are not systematically available for courts and prisons but since most expenditure is labour costs, the ratio of police expenditure to total outlays on law, order and public safety is quite indicative.

A further form of labour - labour substitution that can be mentioned is functional allocation within the forces. It was clear from Table 1 that requirements as measured by vehicle accidents were growing less rapidly than crime measures. Correspondingly there is some small evidence of a reduced relative allocation of police to traffic duties. But the data period is limited and the trend weak, which is perhaps really more consistent with traffic functions as measured by registered vehicles rather than accidents.

Finally, labour - labour substitution is possible in the form of substitution of privately purchased protective services for official police services. No annual data on other protective service workers are available but census data can be examined. This shows a 162 per cent increase in police 1961-1976, as opposed to a 155 per cent increase in other protective service workers (excluding firemen) over the same period. This result, which is consistent with the relative wage movements as seen in Table 3, indicates that there has been no increased reliance upon other protective service workers in total. Given further the finding above that there is increased relative outlay on non-police law and order employees, there must be an even smaller relative increase in private security employees. Details are given in Table 6.

Overall though it is clear that labour - labour substitution has been a major vehicle for matching police requirements with available labour supply, particularly through increased use of females, departmental civilians and other criminal justice employees.

TABLE 6

LABOUR FORCE IN PROTECTIVE SERVICES: AUSTRALIA, 1961-1976

Census Year	Fire Prevention		Police Services		Other Protective Services	
	Male	Female	Male	Female	Male	Female
1976	7575	14	26191	1094	15676	806
1971	6252	-	20703	420	13581	541
1966	5419	-	18942	296	11844	313
1961	4599	-	16607	232	10411	241

Source:

ABS, Census of Population and Housing

(h) Capital - Labour Substitution

Factor substitution is also possible through altered combination of capital and labour resources. In the police context this can mean greater use of vehicles, helicopters, communications equipment and so on. Clearly this has happened over the long-term, but whether as an adjustment response or as the consequence of exogenous technical change is not immediately clear. However the data on the ratio of capital to current expenditure for Australian police forces since 1964 shows no evident trend or close relationship with relative police requirements pressures, indicating that perhaps the latter interpretation is more accurate.

There is a further possibility that increased private outlays on security equipment (safes, alarms, armoured cars etc) could be capital substitution at one further remove. Australian production and import data on these items could be compiled in future research, but this point is not pursued further here as it involves a major new investigation.

(i) Quantity Adjustment

The final area for adjustment to be examined concerns gaps between requirements and supply after other adjustments have taken place. These then become quantity adjustments and represent continuing shortages or surpluses in police manpower. This is a narrower notion of divergence between requirements and labour availability than was presented in section III, since it allows for changes in such coefficients as labour - labour and capital - labour and for changes in requirements and supply produced by relative wage and conditions changes and adjustments in quality levels, hours worked and information and training as discussed above. For this reason the fixed coefficient approach to identifying shortages/surpluses is incomplete or partial since it identifies potential shortages/surpluses not the actual outcome.

For the actual outcome and hence for insight into quantity adjustments, we must turn to some remaining indicators. One obvious indicator might be the ratio of vacancies to unemployed for police. And indeed the Commonwealth Employment Service does record registered vacancies for police and registered unemployed persons whose last employment was in the police forces. These data are given in Table 4. But the recording process for vacancies is very imperfect as is seen by withdrawal of Victoria and NSW Police from registering vacancies in the late 1970's. This explains the changes in the series after 1975. Moreover, even conceptually this is inappropriate since even correctly measured vacancies would indicate unsatisfied effective demand, not unmet requirements. This distinction and its importance was discussed in section III above.

More helpful are indirect indicators such as police efficiency or productivity. These indicate the changing ability of police to meet requirements allowing for the other manpower adjustments indicated. Thus if we look at the

ability of police to obtain committals from crimes investigated or to obtain convictions from crimes investigated we find a steady deterioration in these "clearance rates" over the period for which consistent data could be compiled i.e. 1964-1976. Thus another form of adjustment is that police are less able to cope with criminal prosecution so that the community is obliged to accept a declining ability of the police to apprehend and successfully prosecute offenders. This is not necessarily to blame the forces themselves, though obstruction of significant administrative reforms is evident in some cases. Equally, changes in legal aid provisions could be making the apprehension and prosecution task more difficult. But, in any event, the figures inevitably reflect the decision of governments not to provide the further resources needed to maintain earlier standards of police services. This is a descriptive fact - whether it is desirable or not depends upon the benefits the community feels it derives from the alternative uses to which those resources are put.

VI. A STATISTICAL TEST OF STATE AND TERRITORY ADJUSTMENTS

The preceding analysis looked at Australian totals and drew conclusions from observation of general trends in those totals. For a more limited data period and for a more limited range of adjustment mechanisms it is possible to more formally test for the significant adjustment instruments. Withers (1981b) outlines the compilation of a complete set of criminal justice statistics for each state and territory annually over the period 1964-1976. If these statistics are used some of the conclusions reached in the earlier section may be checked against the state and territory data rather than just Australia averages or totals. This means analysis can be based on 104 observations rather than 16 observations.

To do this two sets of regression equations were specified and estimated. In the first set each adjustment instrument was analysed in turn in relation to each of the

other adjustment instruments and to two measures of the requirements gap. In the second set of regressions the same was done except the requirements gap of the preceding period was used, in order to allow for possible delays in responding to pressures e.g. to permit identification of excess demand and to implement an adjustment policy response. This means the regressions examined the current and lagged transmission of requirement gaps pressures to each individual adjustment instrument controlling for contemporaneous responses in the other instruments.

The two measures used of requirements gaps were a simple fixed coefficient police per capita specification compared to a fixed coefficient crime and accidents specification. The fixed coefficients were calculated for the base period and requirements were thus determined by applying the coefficients to subsequent movements in each state and territory in total population or in crimes and traffic accidents. Crimes were measured as psychic-weighted crimes of violence, and traffic accidents were those involving casualties. The distribution of the force between traffic and crime activities was not obtainable for the base period, so the first available figures (as shown in Table 4) were used. These figures show only small subsequent change in this distribution over time. These fixed coefficient requirements were measured and then deducted from the figures for labour supply of males aged 15-24 and taken as a ratio of police force strength, to indicate a relative requirements gap.

The results are presented in Table 7 which lists the requirement gap elasticities obtained for each adjustment instrument for which data were available. These instruments were: recruit police real wage, experienced constable real wage, cadet to force strength ratio, civilian to force strength ratio, capital - labour expenditure ratio, committals to crimes ratio.

REQUIREMENTS GAP ADJUSTMENT ELASTICITIES

Adjustment Variable	Population Base		Crime and Traffic Base	
	Current	Lagged	Current	Lagged
Real Police Wage (Recruit)	0.09 (2.77)	0.07 (1.99)	-0.01 (-.83)	-0.02 (-1.28)
Real Police Wage (Experienced Constable)	-0.02 (-.81)	-0.02 (-.57)	0.01 (1.21)	0.02 (1.63)
Cadet-Police Ratio	0.08 (.20)	0.18 (.41)	-0.02 (-.10)	0.09 (.54)
Civilian-Police Ratio	0.91 (3.88)	0.91 (3.49)	0.26 (2.81)	0.18 (1.75)
Capital-Labour Expenditure Ratio	1.11 (1.39)	1.36 (1.60)	-0.11 (-.35)	-0.19 (-.59)
Committals-Crimes Ratio	0.61 (2.19)	0.50 (1.71)	-0.18 (-1.72)	-0.26 (-2.43)

Note:

Figures refer to elasticities evaluated at mean value for the requirements gaps in relation to alternative adjustment mechanisms. Numbers in parentheses are t-statistics.

The results generally affirm the conclusions of the aggregate Australian trend analysis. The population based requirements indicator finds that, statistically, the recruit wage, civilian ratio and committals ratio do significantly adjust in response to the requirements gap, though the ^{committals} only in current/^{unlagged} form. The crime and traffic based indicator finds that, statistically, only the civilian ratio and committals ratio adjust significantly in response to the requirements gap, the latter only in lagged form. In no case are senior police wages, cadets, or capital - labour ratios found to be significant adjustment factors. The only divergence from the aggregate Australian findings is that experienced police wages are not significant at all, whereas recruit police wages are ^{significant} on the current population base requirements definition. The real role of wages is thus uncertain, but in no case is there evidence that their role is major in operating as an adjustment vehicle.

VII. CONCLUSION

The outcome of the adjustment process in terms of police employment is that total police force strength in Australia has risen since 1964. The 1979 total forces represent an 80 per cent increase over the 1964 level, as seen in Table 4. This increase has been ahead of population growth and of motor vehicle accident growth, but it is below increases in crime levels and traffic levels. The increase was achieved despite high wastage levels and a diminishing pool of available labour.

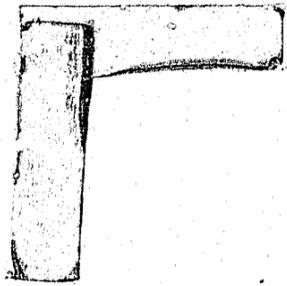
The clearest adjustments to these pressures are seen to have operated through labour - labour substitution (notably females, departmental civilians and other criminal justice employees), and through quantity adjustments in the form of decreased "clearance" of crimes. There is some evidence that relative wages have moved a little in the direction implied by an increasing relative shortage of

police, but no strong evidence of resort to trend changes in allowances, rank inflation, entry standards and recruit quality acceptance levels, work hours, cadet training or capital - labour substitution.

In all, if police requirements are interpreted only in population terms then it could be argued that the adjustments indicated have kept police employment up to requirements despite a decreased potential labour pool. If however requirements are viewed in terms of crime levels and motor traffic, then the non-quantity adjustments adopted have not enabled requirements to be fully met and instead some quantity-adjustment decline in the ability of police forces to maintain crime clearance standards has resulted. By this crime-based view of police requirements there has been an increasing relative shortage of police since the early 1960's in Australia. Governments have increased police provision but not enough to maintain previous standards of law and order.

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